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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

PENDLETON, BRIAN T

ART UNIT PAPER NUMBER

2644

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/747,709

Applicant(s)

GRAUMANN ET AL.

Examiner

Brian T. Pendleton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/8/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10,12-14,16,17 and 19-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,12-14,16,17 and 19-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The prosecution has been reopened under 37CFR 1.198.

Drawings

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings have vertical lines and are illegible. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 7, 9, 10, 12, 13, 16, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knittle et al, US Patent 5,761,638 in view of Marcie, US Patent 6,418,203 further in view of Vahatalo.

In figures 1A and 1B, Knittle et al disclose a telephone network apparatus and method for echo cancellation that uses chirp signal to determine the echo delay of a telephone channel comprising chirp generator 40, user device 25, and matched filter 42. Column 4 lines 18-22

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disclose that echo parameter estimation circuitry 32 which contains the chirp generator 40 and matched filter 42 is used to create a signal from which estimates of the echo delay of the communication channel can be determined. Column 5 lines 11-20 disclose that chirp generator 40 sends a chirp signal over a telephone channel to an user device 25 which is reflected back as an echo signal through terminal A of switch 37 to apparatus 10. The chirp signal is “a waveform”. Column 5 lines 44-49 disclose that the matched filter 42 is able to receive both the output of the chirp generator 40 and the chirp echo signal from terminal A of switch 37. The chirp generator 40 therefore reads on “creating at least two signal streams for a waveform in said audio channel” wherein the two signal streams are the chirp signal and the chirp echo signal sent to the matched filter 42 and the audio channel is the telephone channel. Column 5 line 46 - column 6 line 2 discloses that matched filter 42 filters the chirp echo signal with the time reversed transmitted chirp signal and the peak of the resulting pattern occurs at a time corresponding to the echo delay of the telephone channel. This matched filter 42 accomplishes the method step of “detecting the presence of the first signal sample stream for said waveform and the second signal sample stream for said waveform at a point in said audio channel and measuring the time between the detections of the signal sample streams” wherein the point in the audio channel is the matched filter 42 and measuring the time between the detections of the signal sample streams is done by determining when the peak of the output of the matched filter 42 occurs. Knittle does not disclose delaying at least one of the signal sample streams based, at least in part on the time measured between the detections and that the audio channel is in a computer. Marcie discloses a computer system 10 comprising microphone 12 and speaker 13 which enable the computer system to act as a speakerphone (see figure 1 and column 3 line 60 –

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column 4 line 8). As taught in the abstract, the modem connected to the computer system includes a digital signal processor which performs acoustic echo cancellation. Thus, Marcie taught “a computer system including an audio channel”. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the echo canceller taught by Knittle in the apparatus of Marcie since it was well known that computer systems with speakerphones incurred increased performance with the addition of echo cancellers. Vahatalo discloses a method for echo cancellation comprising adaptive filter 40, calculation element 44, and adjustable delay unit 43. A signal stream (Rin) is delayed based on the measurement of the echo path delay measured by calculation element 44. The objective was to align the digital filter 40 with the location of the echo for improving the performance of the echo canceller. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to delay one of the signal sample streams in the Knittle apparatus for the purpose of improving the performance of acoustic echo cancellation when incorporated in a computer audio channel.

Claim 1 is met.

Similarly claim 12 is met since Knittle reads on “creating at least a first and a second waveform in said audio channel; detecting the presence of the first and second waveform at a point in said audio channel; measuring the time between the detections of the waveforms”.

Regarding claims 2-5, the combination of Knittle et al, Marcie and Vahatalo includes a speaker which would be obvious to one of ordinary skill in the art to use as the audio signal output device to produce the audio output signal generated from the chirp signal generator 40 (signature signal) and a microphone which would be used to detect the chirp signal wherein the

reference channel path is from the chirp generator 40 to the matched filter 42 and the local channel path is from the speaker to the microphone.

As to claim 7, the chirp waveform does comprise a sine waveform in some form.

Per claims 9 and 16, the two different paths in the modified apparatus are from the chirp generator 40 to matched filter 42 and from chirp generator 40 out to an audio output device back to an audio input device (microphone).

As to claims 10 and 17, Marcie discloses a computer system 10.

Per claim 13, Knittle discloses a chirp waveform.

5. Claims 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knittle et al in view of Marcie.

In figures 1A and 1B, Knittle et al disclose a telephone network apparatus and method that uses chirp signal to determine the echo delay of a telephone channel comprising chirp generator 40, user device 25, and matched filter 42. Column 4 lines 18-22 disclose that echo parameter estimation circuitry 32 which contains the chirp generator 40 and matched filter 42 is used to create a signal from which estimates of the echo delay of the communication channel can be determined. Column 5 lines 11-20 disclose that chirp generator 40 sends a chirp signal over a telephone channel to an user device 25 which is reflected back as an echo signal through terminal A of switch 37 to apparatus 10. The chirp signal is "a waveform". Column 5 lines 44-49 disclose that the matched filter 42 is able to receive both the output of the chirp generator 40 and the chirp echo signal from terminal A of switch 37. The chirp generator 40 therefore reads on "creating at least two signal streams for a waveform in said audio channel" wherein the two signal streams are the chirp signal and the chirp echo signal sent to the matched filter 42 and the

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audio channel is the telephone channel. Column 5 line 46 - column 6 line 2 discloses that matched filter 42 filters the chirp echo signal with the time reversed transmitted chirp signal and the peak of the resulting pattern occurs at a time corresponding to the echo delay of the telephone channel. This matched filter 42 accomplishes the method step of “detecting the presence of the first and the second signal sample stream for said waveform at a point in said audio channel and measuring the time between the detections of the signal sample streams” wherein the point in the audio channel is the matched filter 42 and measuring the time between the detections of the signal sample streams is done by determining when the peak of the output of the matched filter 42 occurs. Knittle does not disclose “a machine-readable storage medium, said storage medium having stored thereon instructions, said instructions, when executed by a computer system including an audio channel, resulting in the following steps” as required by claim 19. Marcie discloses a computer system 10 comprising microphone 12 and speaker 13 which enable the computer system to act as a speakerphone (see figure 1 and column 3 line 60 – column 4 line 8). As taught in the abstract, the modem connected to the computer system includes a digital signal processor which performs acoustic echo cancellation. Thus, Marcie taught “a computer system including an audio channel”. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the echo canceller taught by Knittle in the apparatus of Marcie since it was well known that computer systems with speakerphones incurred increased performance with the addition of echo cancellers. It was additionally obvious that since the echo cancellation was implemented in digital signal processing, the processing steps had to reside on a machine-readable storage medium as instructions that could be executed by the computer system. Claim 19 is met.

As to claim 20, Knittle discloses a chirp generator 40.

Regarding claim 21, Marcie discloses a computer system 10 having an audio channel.

Per claim 22, the combination of Knittle and Marcie meet the claim limitations. Knittle discloses a telephone channel which reads on "an audio channel". The chirp generator 40 reads on "creating at least two signal waveforms in said audio channel" wherein one signal waveform in the chirp signal and the second signal waveform is the echo chirp signal received from the user device. The matched filter 42 reads on "detecting the presence of the first and the second waveforms at a point in said audio channel and measuring the time between the detections of the waveforms." As stated above, it was obvious to use echo cancellers, such as taught by Knittle, in Marcie and store instructions on a machine-readable storage medium to be executed by the computer system.

As to claim 23, Knittle discloses a chirp waveform generator 40.

Regarding claim 24, Marcie discloses a computer system 10 having an audio channel.

6. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knittle et al in view of Marcie further in view of Vahatalo as applied to claims 2 and 12 above, and further in view of McMahan, US Patent 4,970,715.

The combination of Knittle, Marcie and Vahatalo does not disclose that the waveform is a pseudo-random sequence waveform. McMahan discloses an a modem with improved remote echo location and cancellation. The apparatus uses a pseudo-random sequence during training of the echo cancellers. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a pseudo-random sequence waveform in the abovementioned combination since it represented a well known alternative test signal.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Knittle et al in view of Marcie further in view of Vahatalo as applied to claim 2 above, and further in view of Park et al, US Patent 5,410,595.

The combination does not disclose counting the number of signal samples between the detections. Park discloses an apparatus and method for echo cancellation for a speakerphone comprising measuring the characteristics of the room in which the speakerphone is located, specifically the echo path delay. Column 5 line 60 – column 6 line 10 discloses a method which counts the number of samples between the start of a test signal and its “first attack”, the time when it is recorded by the microphone. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to count the number of signal samples between detections in the combination of Knittle, Marcie, and Vahatalo, per the teachings of Park, for the purpose of measuring echo delay in a well known alternative method.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Thomas, US Patent 3,721,777.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (703) 305-9509. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (703) 305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian T. Pendleton
Examiner
Art Unit 2644



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